QUIZZES

Practice test 1 unit # 2

10 Questions

7 min

Topics

Angular displacement(Revolution, Degree, Radian)

Start Quiz

06 : 58

Q 1/10 7 min Hint

Q :
By convention, angular displacement is considered positive for

A clockwise motion

B counter clockwise motion

C motion along axis of rotation

D none of these

06 : 56

Q 2/10 7 min Hint

Q :
A particle moves in a circular path of radius r. In half the period of revolution, its displacement and distance covered are:

A $2r, \pi r$

B $r, \pi r$

C $2r, 2\pi r$

D $r\sqrt{2}, \pi r$

06 : 55

Q 3/10 | 7 min | Hint

Q :
Angular displacement is a scalar quantity for:

A Very small value of $\Delta\theta$

B Very large value of $\Delta\theta$

C Any value of $\Delta\theta$

D Can never be scalar

06 : 53

Q 4/10 7 min Hint

Q :
Radian or degree are unit of angular displacement. Their relation is:

A $1rad = \frac{\pi}{180} degree$

B $1rad = \frac{180}{\pi} degree$

C $1degree = \frac{4\pi}{180} rad$

D $1degree = \frac{2\pi}{180} rad$

06 : 49

Q 5/10 7 min Hint

Q :
A circle of radius 1m rolls through some distance making an angle 180o at the centre; find the distance

A 3.14 m

B 3.14 rad

C 5m

D 2.8m

06 : 47

Q 6/10 7 min Hint

Q :

An object is moving along a circular path of radius 4m. What will be its angular displacement if it moves 14m on this circular path?

A 5.5 radians

B 3.5 radians

C 5.0 radians

D 4.5 radians

06 : 45

Q 7/10 | 7 min | Hint

Q : Radian is a unit of angular displacement which can also be measured in degrees. How many radians are equal to one degree?

A $\frac{180}{\pi}$

B $\frac{\pi}{180}$

C $\frac{2\pi}{180}$

D $\frac{\pi}{57.3}$

06 : 44

Q 8/10 7 min Hint

Q : The shaft of a motor rotates at a constant angular speed of 180rev/min. Angle turned through in 1 sec in radian is

A π

B 3π

C 6π

D 12π

06 : 42

Q 9/10 7 min Hint

Q : An object is moving along a circular path of radius 2m. What will be its angular displacement if it moves 10m on this circular path?

A 5.5 radians

B 3.5 radians

C 5.0 radians

D 4.5 radians

06 : 39

Q 10/10 | 7 min | Hint

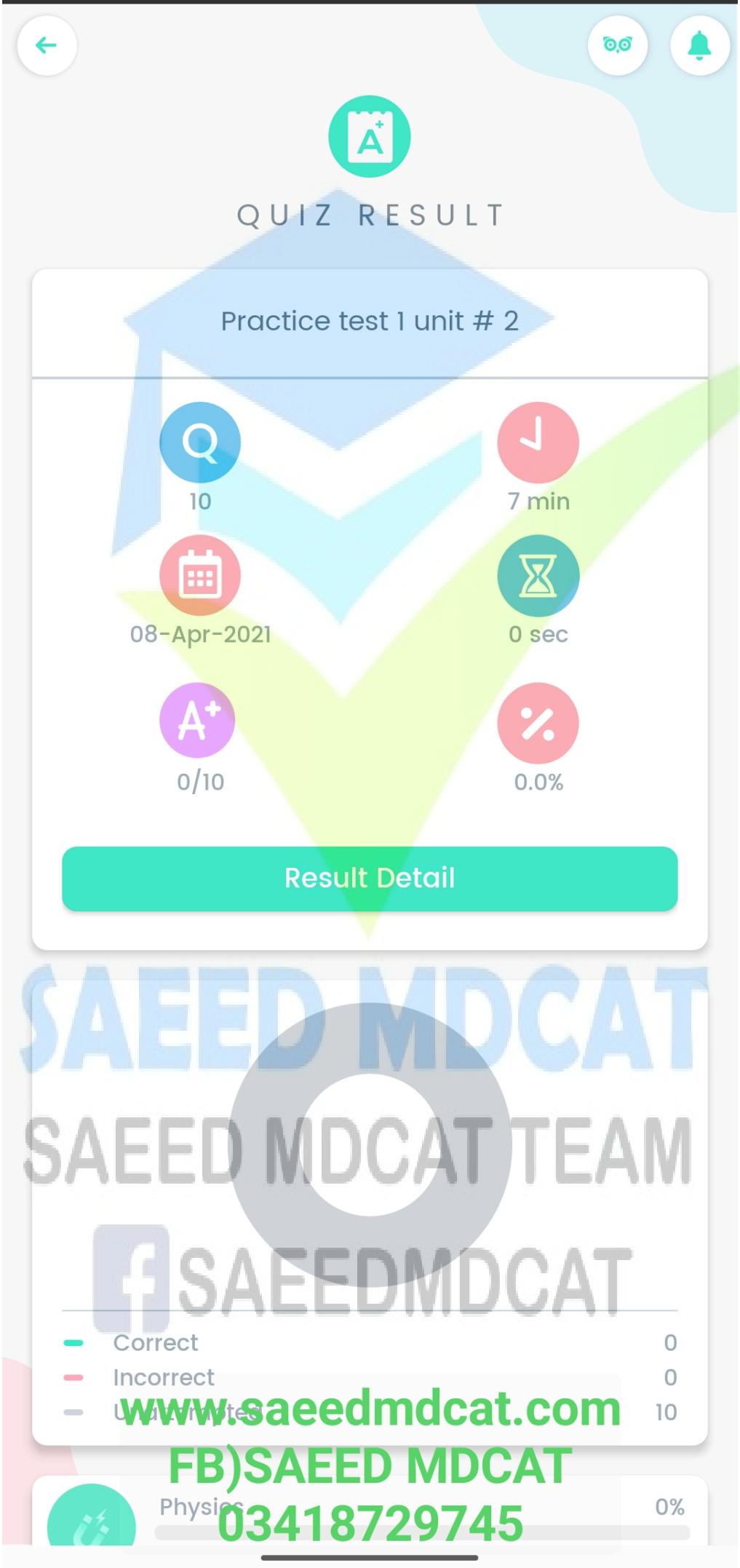
Q : A wheel of radius 1 m covers an angular displacement of 360^{o}. Its linear displacement is

A 3.14 m

B π rad

C 6.28 m

D 0.157 m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Q :
By convention, angular displacement is considered positive for

A clockwise motion

B counter clockwise motion

C motion along axis of rotation

D none of these

Explanation

For counter clockwise rotation angular displacement taken as positive and vise versa.

Correct
Unattempted
Incorrect
Q 2/10

Q :
A particle moves in a circular path of radius r. In half the period of revolution, its displacement and distance covered are:

A $2r, \pi r$

B $r, \pi r$

C $2r, 2\pi r$

D $r\sqrt{2}, \pi r$

Explanation

For semi circle
$|\vec{d}| = 2r$ & $d = \pi r$

Correct
Unattempted
Incorrect
Q 3/10

Q :
Angular displacement is a scalar quantity for:

A Very small value of $\Delta\theta$

B Very large value of $\Delta\theta$

C Any value of $\Delta\theta$

D Can never be scalar

Explanation

At Very large value of $\Delta\theta$ angular displacement is a scalar quantity.

Correct
Unattempted
Incorrect
Q 4/10

Q :
Radian or degree are unit of angular displacement. Their relation is:

A $1rad = \frac{\pi}{180} degree$

B $1rad = \frac{180}{\pi} degree$

C $1degree = \frac{4\pi}{180} rad$

D $1degree = \frac{2\pi}{180} rad$

Explanation

$2\pi rad = 360°$

$1rad = \frac{180}{\pi} degree$

Correct
Unattempted
Incorrect
5/10

Q :
A circle of radius 1m rolls through some distance making an angle 180o at the centre; find the distance

A 3.14 m

B 3.14 rad

C 5m

D 2.8m

Explanation

$S = r\theta \ \therefore \theta = 180^o = \pi \, radian$
$S = 1 \times \pi = 3.14m$

Correct
Unattempted
Incorrect
Q 6/10

Q :

An object is moving along a circular path of radius 4m. What will be its angular displacement if it moves 14m on this circular path?

A 5.5 radians

B 3.5 radians

C 5.0 radians

D 4.5 radians

Explanation

$S = r\theta$

$\theta = \frac{S}{r} = \frac{14}{4} = 3.5\,rad$

Correct
Unattempted
Incorrect
Q 7/10

Q : Radian is a unit of angular displacement which can also be measured in degrees. How many radians are equal to one degree?

A $\frac{180}{\pi}$

B $\frac{\pi}{180}$

C $\frac{2\pi}{180}$

D $\frac{\pi}{57.3}$

Explanation

$2\pi rad = 360^o$

$1^o = \frac{2\pi}{360} rad \Rightarrow 1^o = \frac{\pi}{180} rad$

Correct
Unattempted
Incorrect
8/10

Q : The shaft of a motor rotates at a constant angular speed of 180rev/min. Angle turned through in 1 sec in radian is

A π

B 3π

C 6π

D 12π

Explanation

$$\theta = \omega t = \frac{180 \times 2\pi}{60} \times 1 \Rightarrow \theta = 6\pi \, radian$$

Correct
Unattempted
Incorrect
9/10

Q : An object is moving along a circular path of radius 2m. What will be its angular displacement if it moves 10m on this circular path?

A 5.5 radians

B 3.5 radians

C 5.0 radians

D 4.5 radians

Explanation

$$S = r\theta \Rightarrow \theta = \frac{S}{r} = \frac{10}{2} = 5\,rad$$

Correct
Unattempted
Incorrect
Q 10/10

Q : A wheel of radius 1 m covers an angular displacement of 360^o. Its linear displacement is

A 3.14 m

B π rad

C 6.28 m

D 0.157 m

Explanation

$S = r\theta\ \theta = 360^o$

$= 1 \times \pi\ \theta = 360^o \times \frac{\pi}{180^o} = \pi\, rad$

$= \pi m = 6.28m$

QUIZZES

Practice test 2 unit 2

10 Questions

7 min

Topics

3. Rotational and Circular Motion, Angular velocity

Start Quiz

06 : 58

Q 1/10 7 min Hint

Q : If the body is moving in a circle of radius r with a constant speed v, its angular velocity is:

A v^2/r

B vr

C v/r

D r/v

06 : 57

Q 2/10 7 min Hint

Q : A motor cyclist going round in a circular track at constant speed has:

A Constant linear velocity

B Constant acceleration

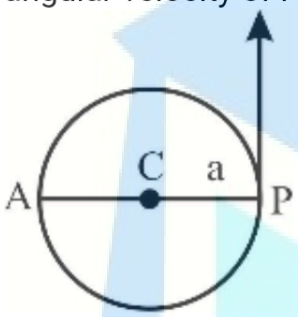
C Constant angular velocity

D Constant force

06 : 55

Q 3/10 7 min Hint

Q : A particle P is moving in a circle of radius ‘a’ with uniform speed v. C is the centre of the circle and AP is diameter. The angular velocity of P about A and C are in the ratio:



A 1 : 1

B 2 : 1

C 1 : 2

D 4 : 1

06 : 53

Q 4/10 7 min Hint

Q :
The ratio of angular frequency and linear frequency is:

A 2π

B π

C $\frac{1}{2\pi}$

D $\frac{\pi}{2}$

06 : 52

Q 5/10 7 min Hint

Q :
In uniform circular motion, the factor that remains constant is:

A Linear velocity

B Centripetal force

C Acceleration

D Speed

06 : 50

Q 6/10 7 min Hint

Q :
The angular velocity of the second hand in a mechanical watch is

A $\frac{\pi}{60}$ rad s^{-1}

B $\frac{\pi}{30}$ rad s^{-1}

C $\frac{\pi}{120}$ rad s^{-1}

D π rad s-1

06 : 49

Q 7/10 | 7 min | Hint

Q :
The angular speed in radian/h for daily rotation of the earth is

A 2π

B 4π

C π/12

D π/6

06 : 47

Q 8/10 7 min Hint

Q :
A constant torque of 500 Nm turns a wheel of moment of inertia 100 kg m2 about an axis passing through its centre. The gain in angular velocity in 2 second is

A 2.5 rad s−1

B 5 rad s−1

C 10 rad s−1

D 15 rad s−1

06 : 46

Q 9/10 | 7 min | Hint

Q : **The racing cars of masses m_1 and m_2 are moving in circles of radii r_1 and r_2 respectively. Their speeds are such that each makes a complete circle in the same length of time. The ratio of the angular speed of the first car to that of the second car is**

A $m_1 : m_2$

B $r_1 : r_2$

C 1:1

D $m_1 r_1 : m_2 r_2$

06 : 43

Q 10/10 7 min Hint

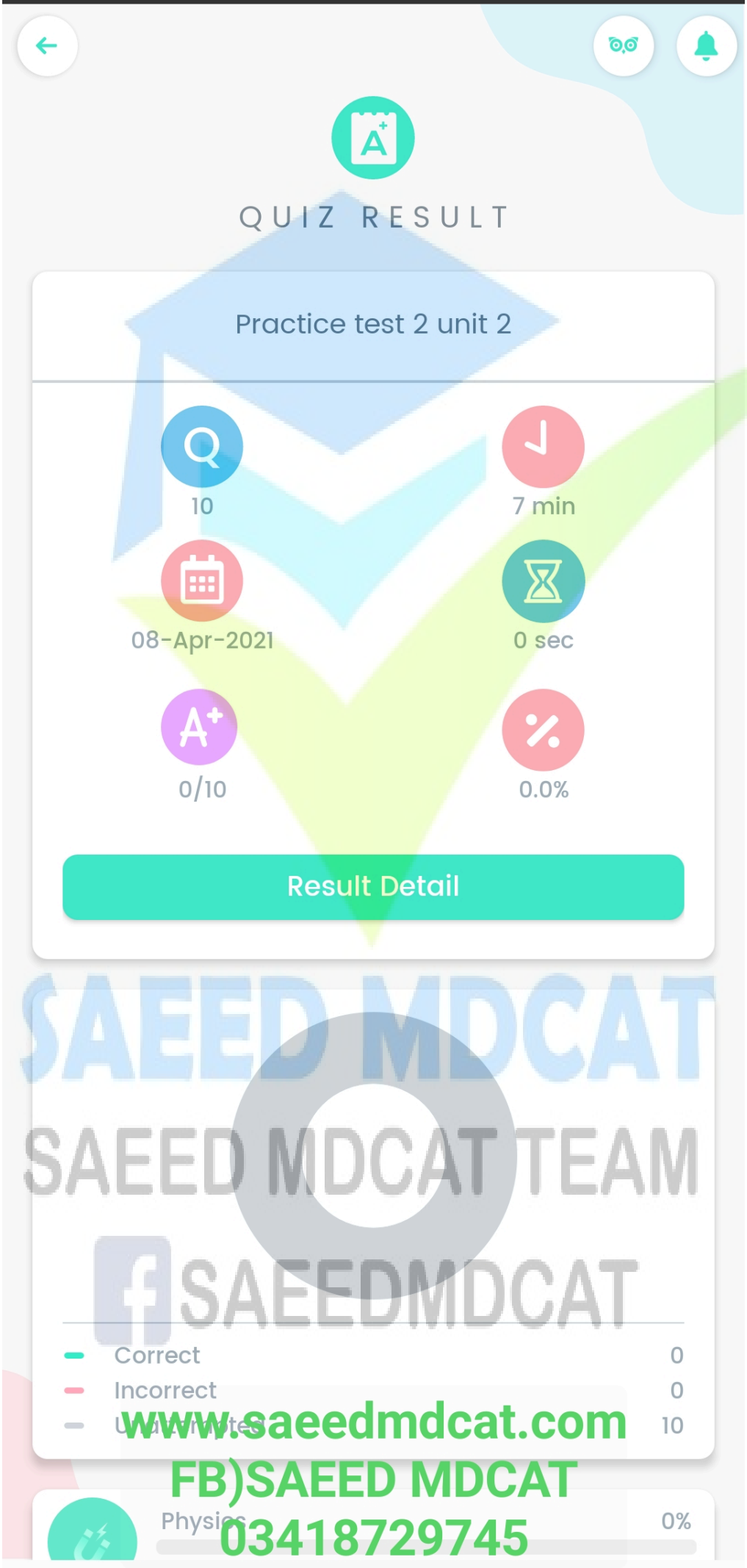
Q : The ratio of angular speeds of minute hand and hour hand of a watch is

A 6 : 1

B 1 : 12

C 12 : 1

D 1 : 6


QUIZ RESULT
Practice test 2 unit 2
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Practice test 2 unit 2

Correct | Unattempted

Incorrect | Q 1/10

Q : If the body is moving in a circle of radius r with a constant speed v, its angular velocity is:

A v^2/r

B vr

C v/r

D r/v

Practice test 2 unit 2

Correct | Unattempted

Incorrect | 2/10

Q : A motor cyclist going round in a circular track at constant speed has:

A Constant linear velocity

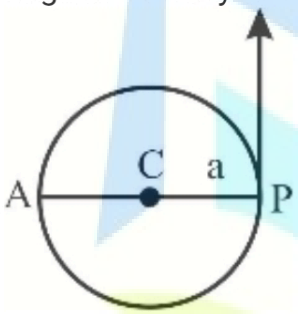
B Constant acceleration

C Constant angular velocity

D Constant force

Correct
Unattempted
Incorrect
Q 3/10

Q : A particle P is moving in a circle of radius 'a' with uniform speed v. C is the centre of the circle and AP is diameter. The angular velocity of P about A and C are in the ratio:



A 1 : 1

B 2 : 1

C 1 : 2

D 4 : 1

Correct
Unattempted
Incorrect
Q 4/10

Q :
The ratio of angular frequency and linear frequency is:

A 2π

B π

C $\frac{1}{2\pi}$

D $\frac{\pi}{2}$

Explanation

$\therefore \omega = 2\pi f \Rightarrow \frac{\omega}{f} = 2\pi$

Correct
Unattempted
Incorrect
5/10

Q :
In uniform circular motion, the factor that remains constant is:

A Linear velocity

B Centripetal force

C Acceleration

D Speed

Explanation

In uniform circular motion speed is constant.

Correct
Unattempted
Incorrect
Q 6/10

Q :
The angular velocity of the second hand in a mechanical watch is

A $\frac{\pi}{60}$ rad s^{-1}

B $\frac{\pi}{30}$ rad s^{-1}

C $\frac{\pi}{120}$ rad s^{-1}

D πrad s-1

Explanation

$$\therefore \omega = \frac{2\pi}{T} = \frac{2\pi}{60} = \frac{\pi}{30} rads^{-1}$$

Correct
Unattempted
Incorrect
7/10

Q :
The angular speed in radian/h for daily rotation of the earth is

A 2π

B 4π

C π/12

D π/6

Explanation

$$\omega = \frac{1\ rotation}{1\ day} = \frac{2\pi}{24} rad/h = \frac{\pi}{12} rad/h$$

Correct
Unattempted
Incorrect
8/10

Q :
A constant torque of 500 Nm turns a wheel of moment of inertia 100 kg m2 about an axis passing through its centre. The gain in angular velocity in 2 second is

A 2.5 rad s−1

B 5 rad s−1

C 10 rad s−1

D 15 rad s−1

Explanation

$$\alpha = \frac{500}{100} = 5\,rad\,s^{-2}$$

$$\Delta\omega = \alpha\Delta t = 5 \times 2\,rad\,s^{-1} = 10\,rads^{-1}$$

Correct | Unattempted | Incorrect | Q 9/10

Q : **The racing cars of masses m_1 and m_2 are moving in circles of radii r_1 and r_2 respectively. Their speeds are such that each makes a complete circle in the same length of time. The ratio of the angular speed of the first car to that of the second car is**

A $m_1 : m_2$

B $r_1 : r_2$

C 1:1

D $m_1 r_1 : m_2 r_2$

Explanation

Both cars complete one rotation after same time interval so have same angular velocity. Hence

$$\frac{\omega_1}{\omega_2} = 1:1$$

Correct | Unattempted | Incorrect | 10/10

Q : The ratio of angular speeds of minute hand and hour hand of a watch is

A 6 : 1

B 1 : 12

C 12 : 1

D 1 : 6

Explanation

$$\frac{\omega_{minhand}}{\omega_{hour.hand}} = \frac{\frac{1rot}{hour}}{\frac{1rot}{12hours}} = 12:1$$

Correct | Unattempted | Incorrect | 10/10

Q : The ratio of angular speeds of minute hand and hour hand of a watch is

A 6 : 1

B 1 : 12

C 12 : 1

D 1 : 6

Explanation

$$\frac{\omega_{minhand}}{\omega_{hour.hand}} = \frac{\frac{1rot}{hour}}{\frac{1rot}{12hours}} = 12:1$$

QUIZZES

Practice test 3 unit 2

10 Questions

7 min

Topics

Relation between linear and angular displacements, Relation between linear and angular velocities, Relation between linear and angular accelerations

Start Quiz

06 : 58

Q 1/10 7 min Hint

Q :
Which of the following is correct relation?

A $\vec{v} = \vec{r} \times \vec{\omega}$

B $\vec{v} = \vec{\omega} \times \vec{r}$

C $\vec{\omega} = \vec{v} \times \vec{r}$

D $\vec{\omega} = \vec{r} \times \vec{v}$

06 : 57

Q 2/10 7 min Hint

Q :
When a wheel 1m in diameter makes 30 rev/min, the linear speed of point on it's rim in ms-1 is

A 2π

B $\frac{\pi}{2}$

C 3π

D 4π

06 : 55

Q 3/10 | 7 min | Hint

Q :

If the position vector of a particle is $\vec{r} = (3\hat{i} + 4\hat{j})$ meter and its angular velocity is $\vec{\omega} = (\hat{j} + 2\hat{k})$ rad/sec then its linear velocity is (in m/s).

A $-(8\vec{i} - 6\vec{j} + 3\vec{k})$

B $(3\vec{i} - 6\vec{j} + 8\vec{k})$

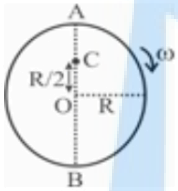
C $-(3\vec{i} - 6\vec{j} + 6\vec{k})$

D $(6\vec{i} - 8\vec{j} + 3\vec{k})$

06 : 53

Q 4/10 7 min Hint

Q : A disc of radius R=20 cm is rotating about its axis with an angular velocity $\omega = 20\, rad\, s^{-1}$ on a horizontal smooth surface. The linear speed of point. C on the disc is



A $1\, m\, s^{-1}$

B $2\, m\, s^{-1}$

C $4\, m\, s^{-1}$

D $4\pi\, m\, s^{-1}$

06 : 51

Q 5/10 7 min Hint

Q :
The angle between angular velocity and angular acceleration when angular velocity decreases is

A 30^o

B 45^o

C 180^o

D 90^o

06 : 49

Q 6/10 7 min Hint

Q : An electric fan has blades of length 30 cm as measured from the axis of rotation. If the fan is rotating at 1200 r.p.m. The acceleration of a point on the tip of the blade is about

A $1600\ m/sec^2$

B $2370\ m/sec^2$

C $4740\ m/sec^2$

D $5055\ m/sec^2$

06 : 47

Q 7/10 | 7 min | Hint

Q :

For a particle in uniform circular motion the relation a = r a of accelerations hold. The acceleration ‘a’

A Is centripetal acceleration

B Is radial acceleration

C Is tangential acceleration

D Both A and B

06 : 46

Q 8/10 7 min Hint

Q : A wheel of radius 1 m covers an angular displacement of 180. Its linear displacement is

A 3.14 m

B π rad

C 6.28 m

D **0.157 m**

06 : 43

Q 9/10 7 min Hint

Q : The shaft of a motor rotates at a constant angular speed of 360rev/min. Angle turned through in 1 sec in radian is

A π

B 3π

C 6π

D 12π

06 : 41

Q 10/10 7 min Hint

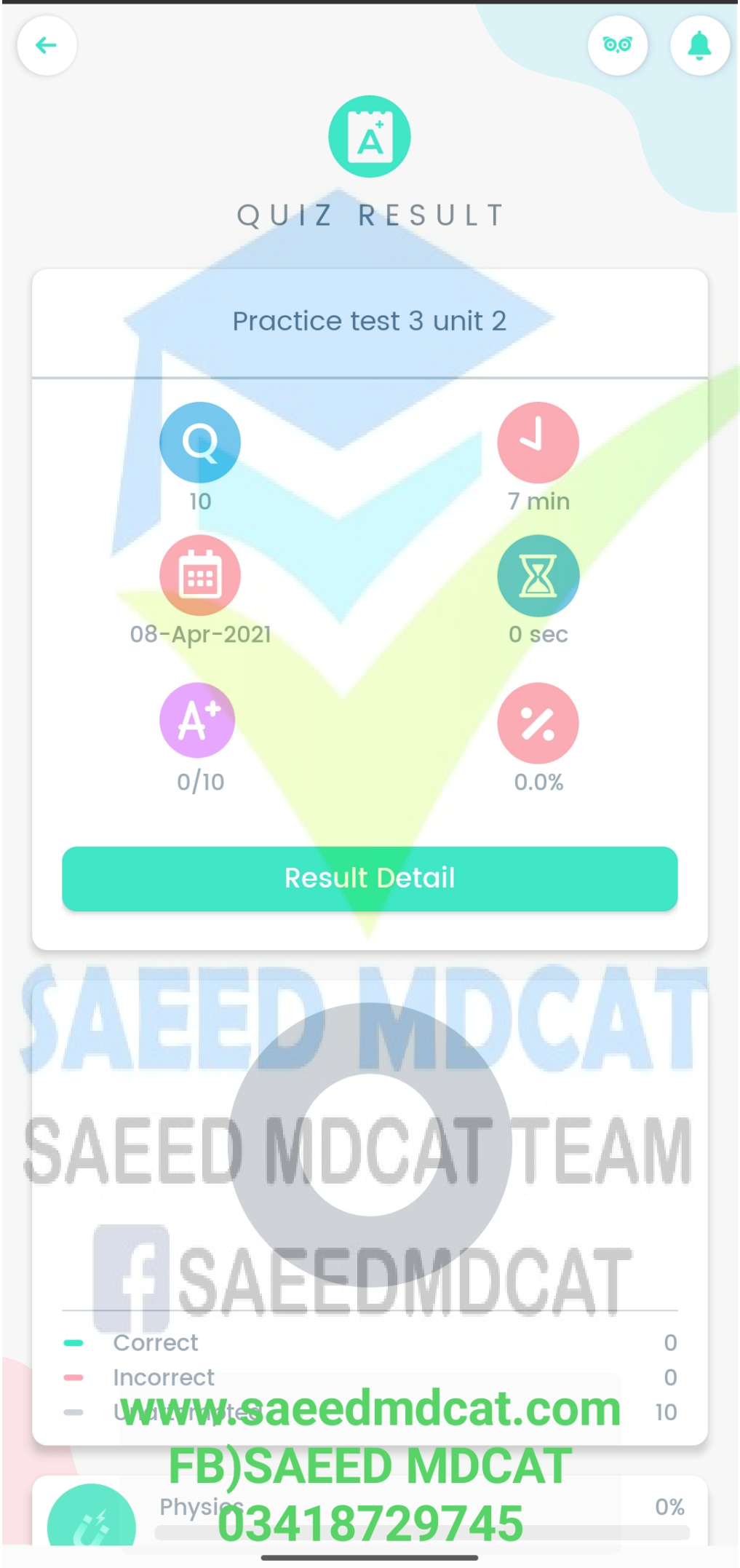
Q : An object is moving along a circular path of radius 4m. What will be its angular displacement if it moves 14m on this circular path?

A 5.5 radians

B 3.5 radians

C 5.0 radians

D 4.5 radians


QUIZ RESULT
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Physics
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Practice test 3 unit 2

Correct | Unattempted

Incorrect | 1/10

Q :
Which of the following is correct relation?

A $\vec{v} = \vec{r} \times \vec{\omega}$

B $\vec{v} = \vec{\omega} \times \vec{r}$

C $\vec{\omega} = \vec{v} \times \vec{r}$

D $\vec{\omega} = \vec{r} \times \vec{v}$

1 2 3 4 5 6 7 8 9

Correct
Unattempted
Incorrect
Q 2/10

Q :
When a wheel 1m in diameter makes 30 rev/min, the linear speed of point on it's rim in ms-1 is

A 2π

B $\frac{\pi}{2}$

C 3π

D 4π

Correct | Unattempted | Incorrect | Q 3/10

Q :

If the position vector of a particle is $\vec{r} = (3\hat{i} + 4\hat{j})$ meter and its angular velocity is $\vec{\omega} = (\hat{j} + 2\hat{k})$ rad/sec then its linear velocity is (in m/s).

A $-(8\vec{i} - 6\vec{j} + 3\vec{k})$

B $(3\vec{i} - 6\vec{j} + 8\vec{k})$

C $-(3\vec{i} - 6\vec{j} + 6\vec{k})$

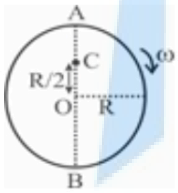
D $(6\vec{i} - 8\vec{j} + 3\vec{k})$

Explanation

$$\vec{v} = \vec{\omega} \times \vec{r} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 0 & 1 & 2 \\ 3 & 4 & 0 \end{vmatrix} = \hat{i}(-8) - \hat{j}(-6) + \hat{k}(-3) = -(8\hat{i} - 6\hat{j} + 3\hat{k})$$

Correct | Unattempted | Incorrect | Q 4/10

Q : A disc of radius R=20 cm is rotating about its axis with an angular velocity $\omega = 20\, rad\, s^{-1}$ on a horizontal smooth surface. The linear speed of point. C on the disc is



A $1\, m\, s^{-1}$

B $2\, m\, s^{-1}$

C $4\, m\, s^{-1}$

D $4\pi\, m\, s^{-1}$

Explanation

$v = r\omega \because r = \frac{R}{2}$

$= 10 \times 10^{-2} \times 20 \Rightarrow v = 2\, m\, s^{-1}$

Practice test 3 unit 2

Correct
Unattempted
Incorrect
5/10

Q :
The angle between angular velocity and angular acceleration when angular velocity decreases is

A 30^o

B 45^o

C 180^o

D 90^o

Correct | Unattempted | Incorrect | 6/10

Q : An electric fan has blades of length 30 cm as measured from the axis of rotation. If the fan is rotating at 1200 r.p.m. The acceleration of a point on the tip of the blade is about

A $1600\ m/sec^2$

B $2370\ m/sec^2$

C $4740\ m/sec^2$

D $5055\ m/sec^2$

Explanation

$a_c = r\omega^2$ here $\omega = \frac{1200(2\pi)}{60} = 40\pi$

$a_c = \frac{30(40\pi)^2}{100} = 4740 ms^{-2}$

Correct
Unattempted
Incorrect
Q 7/10

Q :

For a particle in uniform circular motion the relation a = r a of accelerations hold. The acceleration 'a'

A Is centripetal acceleration

B Is radial acceleration

C Is tangential acceleration

D Both A and B

Explanation

$a_t = r\alpha$

Here a_t is tangential acceleration

Correct | Unattempted | Incorrect | 8/10

Q : A wheel of radius 1 m covers an angular displacement of 180. Its linear displacement is

A 3.14 m

B π rad

C 6.28 m

D **0.157 m**

Explanation

$S = r\theta\ \theta = 180^o$

$= 1 \times \pi$ $\theta = 180^o \times \frac{\pi}{180^o} = \pi\, rad$

$= \pi m = 3.14m$

Correct | Unattempted | Incorrect | 9/10

Q : The shaft of a motor rotates at a constant angular speed of 360rev/min. Angle turned through in 1 sec in radian is

A π

B 3π

C 6π

D 12π

Explanation

$$\theta = \omega t = \frac{360 \times 2\pi}{60} \times 1 \Rightarrow \theta = 12\pi \, radian$$

Correct | Unattempted | Incorrect | 10/10

Q : An object is moving along a circular path of radius 4m. What will be its angular displacement if it moves 14m on this circular path?

A 5.5 radians

B 3.5 radians

C 5.0 radians

D 4.5 radians

Explanation

$$S = r\theta \Rightarrow \theta = \frac{S}{r} = \frac{14}{4} = 3.5\,rad$$

QUIZZES

Practice test 4 unit 3

10 Questions

7 min

Topics

Centripetal force (centripetal acceleration)

Start Quiz

06 : 57

Q 1/10 7 min Hint

Q :
The centripetal acceleration of a body is

A ωr2

B ω2r

C $\frac{\omega}{r}$

D $\frac{\omega^2}{r}$

06 : 55

Q 2/10 7 min Hint

Q :
If a body is moving in circular path with increasing velocity then the magnitude of resultant acceleration of the body is

A $a = a_t + a_c$

B $a = \sqrt{a_t^2 + a_c^2}$

C $a = a_t - a_c$

D $a = a_c - a_t$

06 : 53

Q 3/10 | 7 min | Hint

Q :
If radius of circular path of a moving body is half without changing its speed then, the Fc becomes:

A Half

B Doubled

C One third

D One forth

06 : 51

Q 4/10 7 min Hint

Q :
The weight of a pilot diving down with an acceleration of 9.8 ms-2 will become

A double

B half

C zero

D none of these

06 : 49

Q 5/10 7 min Hint

Q :
An angular ring with inner and outer radii R1 and R2 is rolling w
speed. The ratio of the forces experienced by the
two particles situated on the inner and outer parts
of the ring, $\frac{F_1}{F_2}$ is

A 1

B $\frac{R_2}{R_1}$

C $\frac{R_1}{R_2}$

D $(\frac{R_2}{R_1})^2$

06 : 48

Q 6/10 7 min Hint

Q :
When a particle moves with constant speed on a circular path, then its tangential acceleration is

A positive

B continuously changing

C remains constant

D zero

06 : 45

Q 7/10 | 7 min | Hint

Q :
A stone of mass 16 kg is attached to a string 144 m long and is whirled in a horizontal circle. The maximum tension the spring can withstand is 16 N. the maximum velocity of revolution that can be given to the stone without breaking it, will be:

A 20ms−1

B 16ms−1

C 14ms−1

D 12ms−1

06 : 43

Q 8/10 7 min Hint

Q :
A ball of radius 5 cm rolls down an inclined plane from rest. After 4.0 s, its angular velocity is 8 rads−1. Its angular acceleration and linear acceleration would be respectively

A 2rads−2, 1 ms-2

B 0.2 rads−2, 0.1 ms-2

C Zero, 0.1 ms-2

D 2rads−2, 0.1 ms-2

06 : 42

Q 9/10 7 min Hint

Q : If $\vec{r} = 4\hat{i}$ and $\vec{\omega} = 4\hat{j}$ then $\vec{v}$ is along

A + x – axis

B + z – axis

C –z – axis

D –y – axis

06 : 40

Q 9/10 | 7 min | Hint

Q : If $\vec{r} = 4\hat{i}$ and $\vec{\omega} = 4\hat{j}$ then $\vec{v}$ is along

A + x – axis

B + z – axis

C –z – axis

D –y – axis

06 : 37

Q 10/10 | 7 min | Hint

Q :

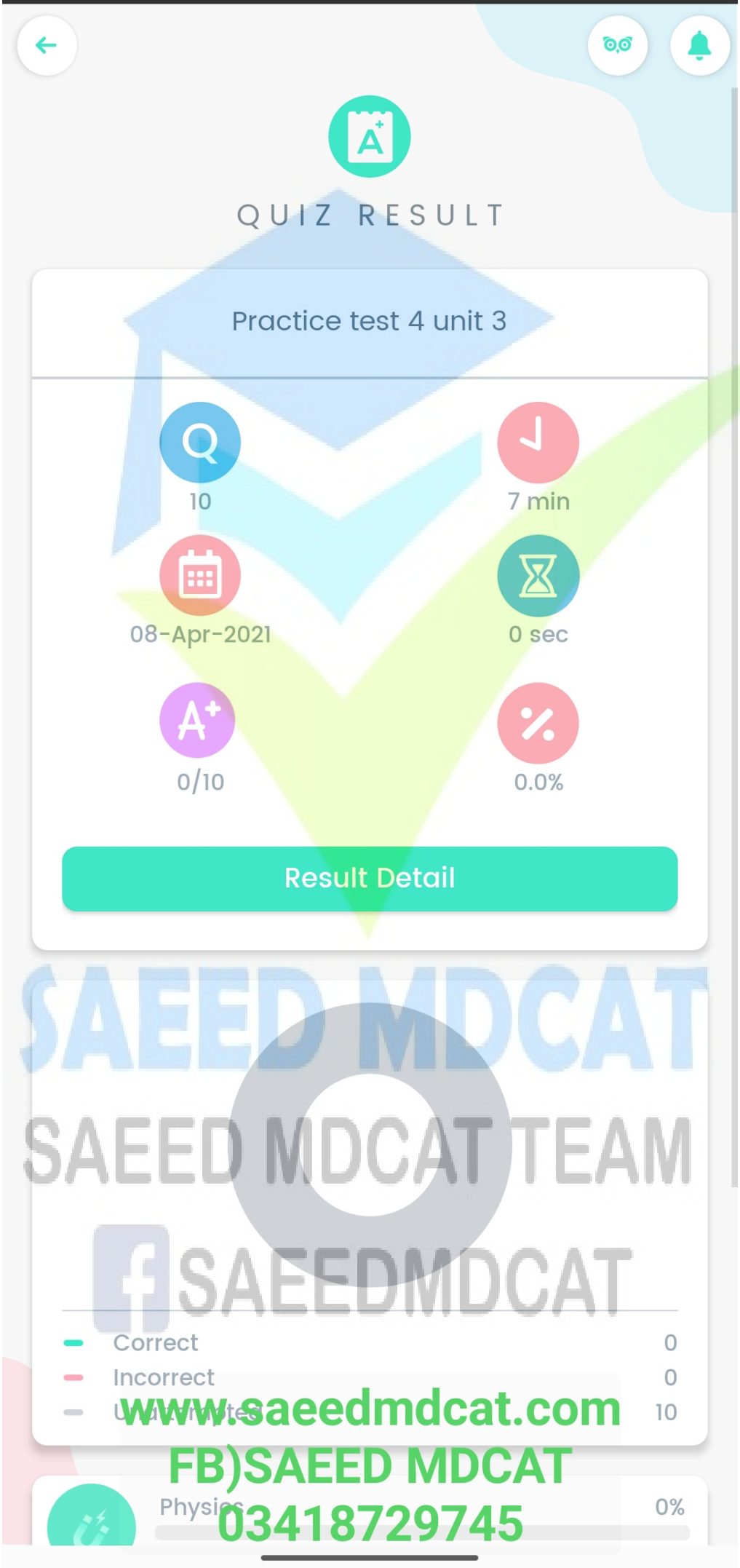
The earth $(mass = 6 \times 10^{24}\ kg)$ revolves around the sun with an angular velocity of 2×10^{-7} rad/s in a circular path of radius 1.5×10^{8} km. The force exerted by sun on earth is:

A $6 \times 10^{19} N$

B $18 \times 10^{25} N$

C $36 \times 10^{21} N$

D $27 \times 10^{39} N$


QUIZ RESULT
Practice test 4 unit 3
10
7 min
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Practice test 4 unit 3

Correct

Unattempted

Incorrect

Q 1/10

Q :
The centripetal acceleration of a body is

A ωr2

B ω2r

C $\frac{\omega}{r}$

D $\frac{\omega^2}{r}$

Explanation

$a_c = \frac{v^2}{r} \quad \therefore v = r\omega$

$a_c = \frac{(r\omega)^2}{r} = r\omega^2$

Correct | Unattempted | Incorrect | Q 2/10

Q :
If a body is moving in circular path with increasing velocity then the magnitude of resultant acceleration of the body is

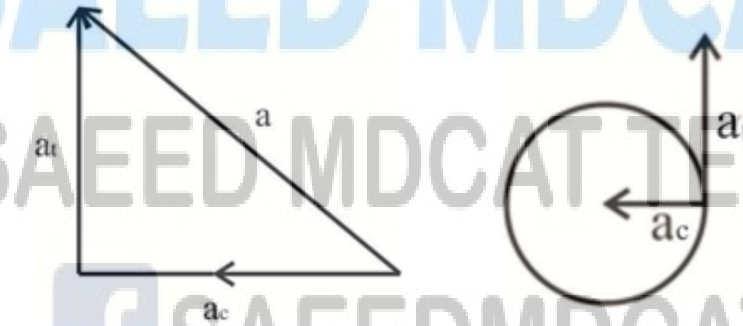
A $a = a_t + a_c$

B $a = \sqrt{a_t^2 + a_c^2}$

C $a = a_t - a_c$

D $a = a_c - a_t$

Explanation



By using Pythagoras theorem

Correct | Unattempted

Incorrect | Q 3/10

Q :
If radius of circular path of a moving body is half without changing its speed then, the Fc becomes:

A Half

B Doubled

C One third

D One forth

Explanation

$$F_c = \frac{mv^2}{r} \rightarrow F_c \propto \frac{1}{r}$$

If radius is half then centripetal force will double

Correct
Unattempted
Incorrect
4/10

Q :
The weight of a pilot diving down with an acceleration of 9.8 ms-2 will become

A double

B half

C zero

D none of these

Explanation

pilot will be in state of weightlessness

Correct
Unattempted
Incorrect
Q 5/10

Q :
An angular ring with inner and outer radii R1 and R2 is rolling w
speed. The ratio of the forces experienced by the
two particles situated on the inner and outer parts
of the ring, $\frac{F_1}{F_2}$ is

A 1

B $\frac{R_2}{R_1}$

C $\frac{R_1}{R_2}$

D $(\frac{R_2}{R_1})^2$

Explanation

Centripetal force on particle = $mR\omega^2$

$\frac{F_1}{F_2} = \frac{mR_1\omega^2}{mR_2\omega^2} = \frac{R_1}{R_2}$

Correct | Unattempted | Incorrect | Q 6/10

Q :
When a particle moves with constant speed on a circular path, then its tangential acceleration is

A positive

B continuously changing

C remains constant

D zero

Explanation

$a_t = r\alpha \quad \because \Delta\omega = 0$

So,

$\alpha = 0$

$a_t = r(0)$

$a_t = 0$

Incorrect

Q 7/10

Q :
A stone of mass 16 kg is attached to a string 144 m long and is whirled in a horizontal circle. The maximum tension the spring can withstand is 16 N. the maximum velocity of revolution that can be given to the stone without breaking it, will be:

A 20ms−1

B 16ms−1

C 14ms−1

D 12ms−1

Explanation

$T = F_c$

$T = \frac{mv^2}{r}$

$16 = \frac{16v^2}{144}$

$144 = v^2$

$v = \sqrt{144}$

$v = 12 ms^{-1}$

Correct
Unattempted
Incorrect
8/10

Q :
A ball of radius 5 cm rolls down an inclined plane from rest. After 4.0 s, its angular velocity is 8 rads−1. Its angular acceleration and linear acceleration would be respectively

A 2rads−2, 1 ms-2

B 0.2 rads−2, 0.1 ms-2

C Zero, 0.1 ms-2

D 2rads−2, 0.1 ms-2

Explanation

$$\alpha = \frac{\Delta \omega}{\Delta t} = a_t = r\alpha$$

Practice test 4 unit 3

Correct | Unattempted

Incorrect | Q 9/10

Q : If $\vec{r} = 4\hat{i}$ and $\vec{\omega} = 4\hat{j}$ then $\vec{v}$ is along

A + x – axis

B + z – axis

C –z – axis

D –y – axis

Explanation

$\vec{v} = \vec{\omega} \times \vec{r}$

Correct | Unattempted | Incorrect | 10/10

Q :
The earth $(mass = 6 \times 10^{24}\ kg)$ revolves around the sun with an angular velocity of 2×10^{-7} rad/s in a circular path of radius 1.5×10^{8} km. The force exerted by sun on earth is:

A $6 \times 10^{19} N$

B $18 \times 10^{25} N$

C $36 \times 10^{21} N$

D $27 \times 10^{39} N$

Explanation

$F = mr\omega^2 = 6 \times 10^{24} \times 1.5 \times 10^{11} \times (2 \times 10^{-7})^2 = 36 \times 10^{21} N$